

REMARKS

In the Office Action dated December 29, 2005, the Examiner rejected claim 26 under 35 USC 112, second paragraph, as being indefinite, rejected claims 1, 6, 7 and 9-14 under 35 USC 103(a) as unpatentable over Lin (US Patent No. 6,483,147) and Lee (US Patent 6,081,037), and rejected claims 8 and 15-16 under 35 USC 103 as unpatentable over Lin and Mitani (US Publication 2003/0057491). Claims 1, 6-16 and 26 remain at issue.

The 35 USC 112, Second Paragraph Rejection

The Examiner rejected claim 26 as indefinite because it recites the term "DAG". The Applicants submit that the term DAG is a well known term of art and is commonly used in the scientific and engineering literature. Specifically, it is a term of art used for thermally and/or electrically conductive paste material. The Applicants performed an internet search using the term "silver DAG" using the Google search engine. A number of technical papers and presentations describing or referring to the term DAG are provided in the attached Exhibit A. The documents provided in the Exhibit include:

(1) First Results from Epitaxial GaN Detectors, W. Cunningham et al., Department of Physics, University of Surrey. See the reference to "silver DAG" on the presentation slide entitled "Ion Beam Induced Charge (IBIC) Measurements";

(2) Contamination of Nakhla By Terrestrial Microorganisms, J.K.W toporski et al., Lunar and Planetary Science.

Both these papers mention the use of silver DAG, demonstrating that the material is commonly known. The applicant has flagged or circled the mention of "silver DAG" in each of the publications for the convenience of the Examiner. The Applicants request that this rejection be withdrawn.

The Art Rejection

The Applicants strongly disagree with the Examiner's rejection. The combination of Lin and Lee, either alone or in combination, does not teach or suggest the present invention as claimed. The Examiner has therefore failed to demonstrate a prima facie case of obviousness.

In the outstanding Office Action, the Examiner acknowledged that the Lin reference failed to teach or suggest the formation of a heat sink in the bulk layer of a semiconductor device using a thermally conductive paste. The Examiner then turns to the Lee reference, which teaches the use of a heat spreader 101 formed over the surface of a chip 11 and a chip mount 31. As noted by the Examiner, see Figure 4 and column 4, lines 46-65. Contrary to the comments made by the Examiner, however, column 4, lines 63-65 of Lee teaches the use of a thermally conductive material (i.e., epoxy) to attach the chip 11 onto mount 31. Lines 46-65 of Lee do not teach the application of the heat spreader 101 to the chip 31 using a thermally conductive material as stated by the Examiner. Lee appears to be silent on this issue, at least in the teaching of the Lee relied on by the Examiner.

The Applicants submit that it is improper to combine the two references as proposed by the Examiner. The Lin reference is directed to the formation of heat sink in the bulk layer of a semiconductor device. The Lee reference is directed to the application of a heat spreader to the surface, not a bulk layer, of a semiconductor chip and a chip mount. The two references are therefore directed to different approaches to removing heat away from a semiconductor chip. Lin uses a heat sink embedded in a bulk layer of the chip itself. In contrast, Lee relies on the mounting of a heat sink onto the surface of the chip.

Furthermore, even if it were proper to combine the two references, it still would not result in the present invention as claimed. The proposed combination would result in the combination of (i) the chip of Lin having a metal, silicide, or nitride heat sink formed in the bulk layer of the chip; and (ii) a heat spreader attached to the surface of the chip. The proposed combination, however, would not result in the present invention as claimed, namely the use of a thermally conductive paste to form a heat sink formed in the bulk layer of a semiconductor device.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

James W. Rose
Reg. No. 34,239

P.O. Box 70250
Oakland, CA 94612-0250
(650) 961-8300